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T&A-105

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

K. SEKINE et al

Serial No. 09/810,195 Group Art Unit: 2681

Filed: March 19, 2001 Examiner:

For: RF OSCILLATOR APPARATUS AND TRANSCEIVER APPARATUS

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

April 4, 2002

Sir:

In response to the Notice of Omitted Item(s) in a Nonprovisional Application dated March 11, 2002, a copy of which is enclosed, please amend the above application as set forth below.

IN THE SPECIFICATION

Replace pages 40-45 of the specification with the enclosed renumbered pages 39-44.

REMARKS

The Applicants request entry of the foregoing amendment to replace original pages 40-45 of the specification with properly renumbered pages 39-44.

It is believed that no additional fees are necessary. However, if fees are deemed to be necessary, the Commissioner is hereby authorized to charge our Deposit Account No. 50-1417.

Respectfully submitted,

Daniel J. Stanger
Registration No. 32,846
Attorney for Applicant(s)

MATTINGLY, STANGER & MALUR, P.C.
1800 Diagonal Road, Suite 370
Alexandria, Virginia 22314
Telephone: (703) 684-1120
Facsimile: (703) 684-1157
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What is claimed is:

1. A RF oscillator apparatus comprising:

a conductor plate supporting a dielectric resonator and a microwave monolithic integrated circuit chip which is electromagnetically coupled to the dielectric resonator; and

a conductive wall which determines a resonance frequency of the dielectric resonator,

wherein the microwave monolithic integrated circuit chip and the dielectric resonator are provided on the same conductor plate.

2. A RF oscillator apparatus according to claim 1, wherein an air gap is formed between the dielectric resonator and the conductor plate.

3. A RF oscillator apparatus according to claim 1, wherein the dielectric resonator is supported by a dielectric supporter such that an air gap is formed between the dielectric resonator and the conductor plate.

4. A RF oscillator apparatus according to claim 3, wherein the dielectric supporter has such a shape as to straddle both sides of the dielectric resonator, and is fixed on the conductor plate at the both sides of the dielectric resonator, and wherein the dielectric supporter and a portion of an upper portion of the dielectric resonator are jointed to each other.

5. A RF oscillator apparatus according to claim 1, wherein the conductive wall covers an upper portion of the dielectric resonator.

6. A RF oscillator according to claim 1, 2, 3, 4 or 5,

wherein a chip capacitor connected to the microwave monolithic integrated circuit chip is loaded on the conductor plate.

7. A transceiver apparatus comprising:

a RF oscillator apparatus having a conductor plate which supports a dielectric resonator, a microwave monolithic integrated circuit chip which is electromagnetically coupled to the dielectric resonator, and a conductive wall which determines a resonance frequency of the dielectric resonator;

a receiving section which makes a RF signal generated from the RF oscillator apparatus a local oscillation signal of a mixer; and

a transmitting section having an amplifier for amplifying power.

8. A transceiver apparatus according to claim 7, wherein the RF oscillator apparatus whose the resonance frequency is set in advance is built into the transceiver apparatus.

9. A transceiver apparatus according to claim 7, wherein such a seal material as to cover an upper portion of the conductive wall is provided.

10. A transceiver apparatus according to claim 7, wherein the receiving section and the amplifier are constituted by microwave monolithic integrated circuit chips.

11. A transceiver apparatus comprising:

a RF oscillator apparatus having a cavity resonator and a conductor plate which supports a microwave monolithic integrated circuit chip electromagnetically coupled to the cavity resonator, a resonance frequency of the cavity resonator

being set in advance;

a receiving section which makes a RF signal generated from the RF oscillator apparatus a local oscillation signal of a mixer; and

a transmitting section having an amplifier for amplifying power.

12. A RF oscillator according to claim 2, wherein a chip capacitor connected to the microwave monolithic integrated circuit chip is loaded on the conductor plate.

13. A RF oscillator according to claim 3, wherein a chip capacitor connected to the microwave monolithic integrated circuit chip is loaded on the conductor plate.

14. A RF oscillator according to claim 4, wherein a chip capacitor connected to the microwave monolithic integrated circuit chip is loaded on the conductor plate.

15. A RF oscillator according to claim 5, wherein a chip capacitor connected to the microwave monolithic integrated circuit chip is loaded on the conductor plate.

16. A transceiver apparatus according to claim 8, wherein such a seal material as to cover an upper portion of the conductive wall is provided.

17. A transceiver apparatus according to claim 8, wherein the receiving section and the amplifier are constituted by microwave monolithic integrated circuit chips.

18. A transceiver apparatus according to claim 9, wherein the receiving section and the amplifier are constituted by microwave monolithic integrated circuit chips.

19. A transceiver apparatus according to claim 16, wherein the receiving section and the amplifier are constituted by microwave monolithic integrated circuit chips.

20. A manufacturing process of a transceiver apparatus, the process comprising the steps of:

preparing a RF oscillator apparatus whose resonance frequency is set in advance, a first semiconductor chip constituting a receiving section which makes a RF signal generated from the RF oscillator apparatus a local oscillation signal of a mixer, and a second semiconductor chip constituting a transmitting section having an amplifier for amplifying power;

fixing the RF oscillator apparatus and the first and second semiconductor chips to a module substrate by an adhesive;

connecting wires of the module substrate to the RF oscillator apparatus and the first and second semiconductor chips by wire bonding, respectively; and

airtightly sealing the RF oscillator apparatus and the first and second semiconductor chips loaded on the module substrate.

21. A manufacturing process of a transceiver apparatus according to claim 20, wherein the module substrate is used as a module substrate having a wiring substrate being connected by the wire bonding and a base substrate supporting the wiring substrate.

22. A manufacturing process of a transceiver apparatus according to claim 20, wherein the RF oscillator apparatus is

used as a RF oscillator apparatus having a dielectric resonator, a conductor plate which supports a microwave monolithic integrated circuit chip electromagnetically coupled to the dielectric resonator, and a conductive wall which determines a resonance frequency of the dielectric resonator.

23. A manufacturing process of a transceiver apparatus according to claim 20, wherein silver paste is used as the adhesive.

24. A manufacturing process of a transceiver apparatus according to claim 21, wherein the RF oscillator apparatus is used as a RF oscillator apparatus having a dielectric resonator, a conductor plate which supports a microwave monolithic integrated circuit chip electromagnetically coupled to the dielectric resonator, and a conductive wall which determines a resonance frequency of the dielectric resonator.

25. A manufacturing process of a transceiver apparatus according to claim 21, wherein silver paste is used as the adhesive.

26. A manufacturing process of a transceiver apparatus according to claim 22, wherein silver paste is used as the adhesive.

27. A manufacturing process of a transceiver apparatus according to claim 24, wherein silver paste is used as the adhesive.

ABSTRACT OF THE DISCLOSURE

The present invention can achieve a completely sub-modularized apparatus, prevent frequency thereof from being fluctuated and reduce manufacturing cost thereof. The present invention has a RF oscillator apparatus whose frequency is set in advance and which is compactly sub-modularized; a transceiving module case which is a base substrate; a transceiving module upper cover which is a seal material covering an upper portion of a conductive wall of the RF oscillator apparatus; a RF circuit substrate which is a wiring substrate loading the RF oscillator apparatus and a receiving mixer and the like; and a bonding wire connecting the RF oscillator apparatus and the receiving mixer and the RF circuit substrate to each other. Since the RF oscillator apparatus whose oscillator frequency is set in advance and which is compactly sub-modularized is built into the transceiver apparatus, the RF oscillator apparatus and other RF circuits is easily connected to one another, it is possible to make the transceiver apparatus compact and a structure thereof simply.